

# Claims

- [c1] 1. A quadrature modulator, comprising:
- a base band transconductance, for converting a voltage signal into a current signal;
  - a switching pair for modulating the current signal;
  - a current sink, coupled between the base band transconductance and a base band transconductance, for detecting a current offset of the current signal, wherein when the current sink is enabled to detect the current offset of a transmitter within a predetermined time interval, the switching pair is disabled, and after the predetermined time interval lapses, the current sink is disabled and the switching pair is enabled.
- [c2] 2. A transmitter, comprising:
- a digital-to-analog converter module for receiving voltage signals;
  - a base band filter module, coupled to the analog converters module;
  - a quadrature module coupled to the base band filter module, for converting filtered voltage signals into current signals and then modulating the current signals;
  - a current sink module, coupled to the quadrature mod-

ule and enabled for intercepting the current signals to detect a current offset before the current signals are modulated;

an offset compensation module, coupled between the current sink module and one of the digital-to-analog converter module, the base band filter module and the quadrature module, for compensating the current offset when the current sink module is enabled; and

a radio frequency amplifier, coupled to the quadrature module, for amplifying the modulated current signals and then transmitting amplified signals to an antenna.

- [c3] 3. The transmitter of claim 2, wherein the quadrature module further a base band transconductance and a switching pair, and the current sink module is arranged therebetween, and when the current sink module is enabled, the switching pair is disabled.
- [c4] 4. The transmitter of claim 3, wherein when the current sink module is enabled within a predetermined time interval, and the switching pair is enabled after the predetermined time interval lapses.
- [c5] 5. The transmitter of claim 2, wherein offset compensation module is coupled between the current sink module and one of the digital-to-analog converter module, the base band filter module and the base band transconduct-

tance.

- [c6] 6. The transmitter of claim 1, wherein the offset compensation module is a voltage offset compensator.
- [c7] 7. The transmitter of claim 6, wherein the voltage offset compensator further comprises a current-to voltage converter coupled to the current sink module, and a direct current (DC) offset minimum loop coupled to the current-to voltage converter for compensating a voltage offset within the predetermined time interval.
- [c8] 8. The transmitter of claim 6, wherein the DC offset minimum loop is further coupled to one of the digital-to-analog converter module, the base band filter module and the base band transconductance.
- [c9] 9. A method for detecting and compensating a current offset for a transmitter, the transmitter having a quadrature modulator including a base band transconductance stage, a switching pair and a current sink arranged therebetween, the method comprising:  
enabling the transmitter;  
turning on the current sink and turning off the switching pair for a predetermined time interval;  
compensating the current offset within the predetermined time interval; and

turning off the current sink and turning on the switching pair after the predetermined time interval lapses.

- [c10] 10. A method for detecting and compensating a current offset for a transmitter, comprising:
- enabling the transmitter;
  - receiving voltage signals and converting the voltage signals into current signals;
  - intercepting a current offset of the current signals before the current signals are modulated and transmitted; and
  - compensating the current offset within the predetermined time interval.